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Agricultural Memorandum No 426

Frequency of heavy rains during critical crop periods

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Agricultural Memorandum 401 gave the monthly distribution of periods of heavy rain. It is now required to find the frequency of such rains at certain critical crop periods.

The interpretation is difficult; firstly the sample used was only 10 years and there is no guarantee of consistency in time on a monthly basis, even if seasonal variations are fairly reliable; secondly there is no guarantee of consistency in place, as many of the heavy summer rainfalls were due to showers and hence unreliable in location.

A certain smoothing has therefore to be adopted, as follows:-

Crop		Critical Period	Smoothing
Peas		June	½ May+June+½ July/4
Winter Cereal		Last week June, first week July.	June+July/4
Spring Cereal		First 2 weeks July	½ June+1½ July/4
Potatoes	1.	Last week May First week June	May+June/4
	2.	Last 2 weeks June	1½ June + ½ July/4
Sugar Beet		First 2 weeks May	½ April + 1½ May/4
Spring Sowing		March and April	Feb+2 March+2 April + May/3

The results are given in Tables 1 and 2 for the 35 stations in the sample.

Little dependence on annual rainfall could be found within the lower rainfall ranges, although this influence is clearly shown in the south west end in Wales.

/Averages

Averages (in the lower rainfall range) can then be taken as follows.

1. Frequencies (in 10 years) of 50 mm in 3 days at critical periods:-

Area	Crop						
	Peas	Cereals		Potatoes		Sugar Beet	Spring Sowing
		Winter	Spring	1	2		
North (below 1000 mm)	0.9	0.65	0.85	0.3	0.4	0.25	0.5
Midlands (below 900 mm)	1.5	0.75	0.55	0.7	1.0	0.1	0.8
East	0.2	0.3	0.2	0	0.1	0	0
Southeast (below 850 mm)	1.2	0.65	0.5	0.5	0.8	0.2	0.3
Southwest (below 800 mm)	1.3	0.6	0.4	0.7	0.8	0.3	0.2
Wales (below 1200 mm)	0.7	0.5	0.4	0.3	0.5	0	1.1

2. Frequencies in 10 years of 50 mm in 7 days at critical periods:-

Area	Crop						
	Peas	Cereals		Potatoes		Sugar Beet	Spring Sowing
		Winter	Spring	1	2		
North (below 1000 mm)	4.0	2.6	3.6	1.4	1.7	1.5	6.4
Midlands (below 900 mm)	8.0	4.5	3.0	4.8	5.8	2.2	6.3
East	2.6	1.6	1.6	1.0	1.9	0.5	1.5
Southeast (below 850 mm)	8.0	4.3	3.6	3.6	5.0	1.2	3.5
Southwest (below 800 mm)	9.0	3.5	2.1	5.5	4.8	4.1	6.3
Wales (below 1200 mm)	10.0	5.2	4.9	4.8	5.5	3.5	-

The spring sowing period frequencies vary appreciably with annual rainfall (see Table 2).

			Peas	Cereals		Potatoes		Sugar Beet	Spring Sowing
		mm		Winter	Spring	1	2		
NORTH	York	(627)	0	0	0	0	0	0	0
	Durham	(668)	0	0	0	0	0	0	0
	Wakefield	(670)	0.5	0.5	0.7	0	0.3	0	0
	Cockle Park	(729)	1.5	1.0	1.5	0.5	0.5	0.7	2.7
	Carlisle	(815)	1.5	0.7	0.4	0.7	1.1	0	0
	Bradford	(853)	1.3	0.5	0.7	0.7	0.3	1.1	1.0
	Ruthwell	(937)	1.7	1.7	2.6	0	0.9	0	0
	Settle	(1188)	1.0	1.0	1.5	0	0.5	0	0
MIDLANDS	Cranwell	(597)	2.2	1.0	0.7	1.3	1.3	0.7	0.7
	Oxford	(652)	1.5	0.7	0.4	0.7	1.1	0	0
	Cheltenham	(693)	1.5	0.7	0.4	0.7	1.1	0	0
	Loughborough	(715)	1.0	0.5	0.3	0.5	0.7	0	2.0
	Birmingham	(780)	0.5	0.5	0.7	0	0.3	0	1.3
	Longton	(857)	2.2	1.1	0.9	1.0	1.6	0	0.7
EAST	Shoeburyness	(516)	0	0	0	0	0	0	0
	Cambridge	(551)	0.7	1.5	1.1	0	0.4	0	0
	Gorleston	(607)	0	0	0	0	0	0	0
	Sprouston	(645)	0	0	0	0	0	0	0
	Sandringham	(691)	0	0	0	0	0	0	0
SOUTHEAST	Kew	(608)	0.7	0.7	1.1	0	0.4	0	0
	E. Malling	(683)	2.3	1.0	0.7	1.3	1.3	0.7	0.7
	Hastings	(739)	1.0	0.5	0.3	0.5	0.7	0	0
	Andover	(750)	0	0	0	0	0	0	0.7
	Edenbridge	(807)	2.0	1.0	0.5	1.0	1.5	0	0
	Compton House	(963)	1.7	1.3	1.9	0.5	0.6	0.7	1.0
SOUTHWEST	Taunton	(744)	1.5	0.7	0.4	0.7	1.1	0	0
	Street	(765)	0	0	0	0	0	0	0
	Bath	(785)	2.3	1.0	0.7	1.3	1.3	0.7	0.7
	Beaminster	(1019)	1.7	1.3	1.9	0.5	0.6	0.7	1.0
	St.Austell	(1228)	3.0	1.7	1.6	1.3	1.9	0.4	0.7
WALES	Llandudno	(731)	0	0	0	0	0	0	0
	Llanerch Y Medd	(1024)	0.5	0.5	0.7	0	0.3	0	0.3
	Cardiff	(1069)	0.7	0.5	0.5	0.3	0.5	0	0.3
	Newbridge	(1127)	1.5	0.7	0.4	0.7	1.1	0	4.0
	Lake Vyrnwy	(1605)	3.5	2.7	3.6	0.7	1.9	0.5	6.0

Table 1 Frequency of occasions in 10 years with 50 mm in 3 days at critical crop periods.

		mm	Peas	Cereals		Potatoes		Sugar Beet	Spring Sowing
				Winter	Spring	1	2		
NORTH	York	(627)	3.2	1.7	2.6	1.5	0.9	2.2	2.3
	Durham	(668)	0	0	0	0	0	0	0.7
	Wakefield	(670)	3.0	1.7	2.6	1.2	0.9	1.9	2.7
	Cockle Park	(729)	5.0	3.5	5.2	1.5	1.7	1.9	11.3
	Carlisle	(815)	7.0	4.5	4.2	2.5	4.7	0	1.3
	Bradford	(853)	4.5	2.0	3.0	2.5	1.0	3.7	11.3
	Ruthwell	(937)	5.5	5.0	7.5	0.5	2.5	0.7	15
	Settle	(1188)	15	11.5	16	3.7	6.7	2.5	22
MIDLANDS	Cranwell	(597)	10.5	5.2	3.4	5.3	6.4	2.3	2.3
	Oxford	(652)	9.2	4.0	2.0	5.3	6.0	1.9	3.0
	Cheltenham	(693)	9.0	3.5	1.7	5.5	5.3	3.0	2.7
	Loughborough	(715)	6.0	3.0	1.5	3.0	4.5	0.5	8.3
	Birmingham	(780)	6.2	2.7	1.9	3.5	3.1	3.4	14.7
	Longton	(857)	15	8.5	7.5	6.5	9.5	1.9	6.7
EAST	Shoeburyness	(516)	3.5	2.0	1.5	1.5	2.5	0	0
	Cambridge	(551)	3.7	3.0	3.7	0.7	3.4	0	0
	Gorleston	(607)	5.3	2.7	2.6	2.5	2.9	2.0	4.0
	Sprouston	(645)	0.7	0.5	0.3	0.5	0.7	0.1	1.3
	Sandringham	(691)	0	0	0	0	0	0.3	2.3
SOUTHEAST	Kew	(608)	6.3	4.3	4.4	2.0	4.1	0	0
	E.Malling	(683)	10.5	5.3	4.1	5.3	6.4	2.3	2.3
	Hastings	(739)	2.7	1.5	1.0	1.3	2.0	0	3.0
	Andover	(750)	8.3	4.0	3.7	4.3	4.3	3.0	3.5
	Edenbridge	(807)	12	6.5	4.7	5.5	8.3	0.7	9.0
	Compton House	(963)	11.5	7.7	10.1	3.7	4.4	3.6	19
SOUTHWEST	Taunton	(744)	6.7	2.3	1.1	4.5	3.4	3.7	5.7
	Street	(765)	6.7	2.3	1.3	4.5	2.9	4.1	4.3
	Bath	(785)	13.5	6.0	4.0	7.5	8.0	4.5	9.0
	Beaminster	(1019)	12.3	6.5	7.3	6.7	5.7	6.0	26
	St.Austell	(1228)	18	7.7	7.1	10.3	8.4	9.7	42
WALES	Llandudno	(731)	3.0	1.5	0.7	1.5	2.3	0	5.3
	Llanerch Y Medd	(1024)	11.5	5.3	5.1	6.3	5.4	5.3	14
	Cardiff	(1069)	17	9.5	10.5	7.3	8.5	6.1	15
	Newbridge	(1127)	9	4.7	3.4	4.3	6.1	2.7	28
	Lake Vyrnwy	(1605)	42	25	30	17	19	19	80

Table 2 Frequency of occasions in 10 years with 50 mm in 7 days at critical crop periods.

Any comments or criticism on this paper should be referred to the Author.

Meteorological Office
Bracknell, Berks

February 1972

15215/AJT/2/72/60